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Mitigating the Dark Side of Agile Teams: Peer Pressure, Leaders' Control, and the Innovative Output of Agile Teams

Abstract

Increasingly, organizations have been employing self-managing teams to circumvent bureaucratic controls and stimulate innovation. However, this goal is not easily achieved; in many situations, informal controls replace formal controls. This study develops a multi-level perspective of control. We explicitly analyze control mechanisms at different levels of the organization and how they affect innovative team output. We theorize and empirically investigate a potential downside of horizontal social control mechanisms at the team level (i.e., peer pressure) affecting self-managing teams' innovative outcomes. We also discuss managerial control mechanisms at the organizational level (i.e., interactive and diagnostic management control systems) that may help to mitigate such negative effects. We theorize how they may influence the innovative output of self-managing teams, both directly and interactively. We chose a multi-level, multi-source setting for our study and ran three parallel surveys with employees in a Fortune 500 firm. 248 team members, 126 internal team leaders, and 97 organizational leaders enabled us to create a unique database of 97 self-managing software development teams. Our findings confirm that peer pressure is common among established agile teams and that it negatively influences the innovative output of the agile teams. Moreover, our findings show that the magnitude of the effect of peer pressure is contingent on control mechanisms

at higher levels within the organization. This enables us to provide new theoretical insights regarding the paradoxical effect of managerial control systems when it comes to flat organizations and autonomous teams. Additionally, we provide practical guidelines for managers who increasingly adopt agile practices but at the same time face issues with regard to innovation.

Practitioner Points

- People working in self-managing teams, despite being empowered by autonomy, can often be constrained by accumulated peer pressure, leading to reduced team innovativeness.
- Team managers can help improve overall team performance when team members are subject to peer pressure through two key interventions: target optimization & frequent interaction.
- A focus on optimizing targets and outcomes is beneficial when peer pressure is high and has a potentially detrimental effect when peer pressure is low.
- Frequent interaction and guidance on behalf of the manager also demonstrates an overall positive effect, but the effect is strongest when peer pressure is low.

Keywords: Agile teams, peer pressure, interactive control, diagnostic control, managerial control systems

Introduction

Today's organizations need to innovate (e.g., Doran and Ryan, 2016; Volberda et al., 2021) to survive increasingly dynamic environments, and teams often become the locus of innovation (e.g., Weiss, Backmann, Razinskas, and Hoegl, 2018). However, innovation does not come easily. Implementing creative ideas can be difficult (Baer, 2012), and many innovation projects remain incomplete (Todt, Weiss, and Hoegl, 2018; 2019). To stimulate innovative output, large firms increasingly reorganize themselves around self-managing work teams, such as agile teams (Cooper and Sommer, 2016; Grass, Backmann, and Hoegl, 2020). A self-managing team is a "group of individuals with diverse skills and knowledge with the collective autonomy and responsibility to plan, manage, and execute tasks interdependently to attain a common goal" (Magpili and Pazos, 2018: 4). By combining elements of an organic structure (Burns and Stalker, 1961; Volberda, 1996; Slater, Mohr, and Sengupta, 2014) with new and more indirect forms of control (Heydebrand, 1989; Sewell, 1998), organizations aim to acquire more flexibility, creativity, and speed to overcome the inertia associated with bureaucratic control.

However, despite the increasing popularity of self-managing teams, they do not always deliver on promises to enhance teams' innovative output; previous research shows that self-managing teams do not always achieve high levels of innovativeness (Cardinal, 2001; Wegman, 2001). This variation in the success of self-managing teams achieving innovative outcomes is likely explained by the organizational context in which such teams are embedded (Baer and Frese, 2003; Ahmadi et al., 2017), and important contributing factors include the roles of leaders and line managers (Kreutzer et al., 2015; Khanagha, Volberda, Oshri, 2017). Control systems, i.e., mechanisms to ensure alignment between employees' capabilities, actions, and performance with organizational goals and aspirations (Sitkin, Cardinal, and Bijlsma-Frankema, 2010), are particularly important in this regard. They are associated with various managerial challenges, including those related to innovation (Coelho et al., 2020; Turner and Makhija, 2006). When combining social control exercised by team peers, understanding the effect of managerial control becomes more complex. Multi-level interactions between team-level dynamics and the wider organizational context are likely to influence teams' general and innovative performances (cf. Magpili and Pazos, 2018; and Jansen, Kostopoulos, Mihalache, and Papalexandris, 2016). Specifically, this study sets out to reveal the paradoxical relationship between high team autonomy and managerial controls. While self-managing teams may facilitate innovation, they can also bear unwanted side-effects, such as high peer pressure, which can hurt the team's balance and performance. Simultaneously, although managerial control practices can stifle innovation in the same context, they can also counter the negative effects of high peer pressure by limiting destructive behaviors and regulating extrinsic and intrinsic motivation. Previous research has largely overlooked multi-level implications of providing autonomy for teams. Several studies on internal regulations have explicitly called for multi-level conceptualization and analysis of interactions between organizational controls and team-level social dynamics (Long and Sitkin, 2018; Stewart et al., 2012). Such cross-level effects are particularly relevant when exceeding a routine-based performance outcome, focusing on prior research on organizational controls (e.g., Kreutzer et al., 2015) and investigating the overlooked question (Siciliano, 2016) of how various control mechanisms affect creativity and innovativeness.

With this in mind, we build on the seminal work by Simons (1994) to identify key managerial control systems (interactive and diagnostic) and group level social controls (peer pressure), and we explore how these factors influence the innovative outcome of agile teams. This article aims to deepen our understanding regarding different manifestations of organizational control and how they interact with and affect the innovative performance of self-managing teams. First, by developing a multi-level perspective on the control of self-managing teams, we extend research on the implications of organizational controls (Cardinal et al., 2017; Long and Sitkin, 2018); we investigate how different types of team and organizational behavior can affect team innovation. Specifically, we propose that internal peer pressure, a potential consequence for self-managing teams, relates to a team's overall ability to innovate. This relationship depends on the leader's control behavior, particularly on the diagnostic and interactive controls implemented. By evaluating how the organizational-level control level influences the team-level internal regulation process, this article attempts to shed light on the tensions between external forces enacted through existing managerial control systems and internal forces exerted horizontally, i.e., by peers within self-managing teams. In this way, we aim to advance the idea that different control systems need to be considered in combination (e.g., Loughry and Tosi, 2008; Stewart et al., 2012). Second, we add to literature seeking to identify strategies for avoiding issues inhibiting innovation within teams (e.g., Todt, Weiss, and Hoegl, 2017). We do this by conceptualizing the management layer as moderating the effects of social influence within the self-managing team. This moderation ensures that the team's activities align with the organization's goals and strategy; we examine how managerial control may affect the teams' innovative output, an area that has not yet been widely studied (Büschgens et al., 2013). We distinguish two types of controls, namely diagnostic and interactive controls (Simons, 1994). Diagnostic controls are traditional management control system used to monitor and optimize targets and outcomes. Interactive controls, on the other hand, can be considered a more active form of control that is based on stimulating managers to communicate with the employees and to support them. We also consider innovative output as a performance outcome, thereby extending prior research (e.g., Kreutzer et al., 2015) primarily focused on how general performance outcomes are affected by managerial controls.

We develop five hypotheses and test the research model (Figure 1) with multi-level and multi-source data collected from 97 self-managed, agile research and development (R&D) teams and the various management layers in a large multinational corporation (MNC), a leader in the telecommunications industry. Like many information and communication technology organizations, the firm decided to move to agile software product development. While peer pressure emerges from interactions between team members, it is measured directly at the group level. To visually capture the process of emergence, we have included an additional level in Figure 1.

Please insert Figure 1 about here

Theory development

Self-managing teams and peer pressure

Peer pressure can be a consequence of flatter management structures and increased worker autonomy (Tompkins and Cheney, 1985). Although self-managing teams might experience less bureaucratic control, they are not free from control because peer pressure can often develop. This kind of social pressure directs employees' behavior toward accomplishing organizational objectives without relying on the bureaucratic hierarchy. Team members develop mechanisms "in concert" to control their activities (Tompkins and Cheney, 1985). By cooperating on common team tasks, team members establish norms for their activities. Initial norms, representing "correct" behavior, are the basis and formal instrument to exercise control (Jermier et al., 1991), leading to peer pressure developing within the team.

Peer pressure can be understood as a team-level phenomenon, defined as a system of control exerted and perpetuated by workers, which involves micro-techniques of discipline for regulating and normalizing collective team action and the actions of individual employees. Peer pressure emerges as a dimension of team culture (Akgün, Keskin, & Byrne, 2010; Owens &

Hekman, 2016). Team members' shared norms and values legitimize attempts to influence teammates' behavior through verbal disapproval such as direct demands, open confrontation, or guilt-inducing comments (Druskat and Kayes 2000). While individual team members apply pressure, they act based on collective norms and the behalf of their team (De Jong, Bijlsma-Frankema, and Cardinal, 2014). The emergence of peer pressure is, therefore, a dynamic, interactive process. More specifically, following the definition of emergence by Kozlowski and Klein (2000), we consider peer pressure to be a bottom-up phenomenon, whereby individual characteristics and dynamic social interaction yield a higher-level group property.

When employees work together to generate their own social rules, this can give rise to a feeling of collective empowerment (e.g., Sinclair, 1992; Barker, 1993). This refers to a belief that, to reach specific ends, an individual can influence other people or events in an organization or a group (Greenberger and Strasser, 1986; Kanter, 1977). However, in this kind of participative environment, individual autonomy, which allows the employee to decide when and how to perform a task (Hackman and Oldham, 1976), is likely to be overridden by pressures to conform to other team members' expectations. Here autonomy becomes collective rather than individual (Herman, 1982), and the locus of control moves from the organizational management to team members, who cooperate by creating social rules and norms. These rules and norms then drive their behaviors, constituting the basis for meaning and sanctioning modes of social conduct (Barker, 1993).

Through a process of internalization, which occurs when employees feel a sense of identity within the organizational value system, peer pressure becomes part of the "standard operating procedure." Classification usually legitimizes uninterrupted individual domination inside the team (Greenblatt, 1986; Hacking, 1986). Classifying individuals as poor or good workers is relevant for determining which employees make active contributions, as expected by others, and sanctioning employees who do not (Foucault, 1980). Team members are evaluated against a norm or average, so rankings are constantly generated. Continuous surveillance, which normalizes behavior, is likely to help employees develop self-control and establish an organizational conscience (Merton, 1968; Presthus, 1962; Ruitenbeek, 1963, Whyte, 1956).

Team innovation

Organizations are increasingly reliant on teams developing innovative solutions. Entrepreneurial teams, new venture teams, R&D teams, new product development (NPD) teams, and science teams are some common terms used for describing what are, essentially, innovation teams (ITs). While these teams operate in different environments, experience contextual differences in risk level and uncertainty, and their responsibilities may vary, they all share the common goals of developing and implementing new products, processes, or solutions (Thayer, Petruzzelli, and McClurg, 2018).

Due to its seemingly contradictory demands, team innovation is a complex, paradoxical process. ITs explore creative ideas and exploit existing knowledge so that creative solutions can be feasibly and usefully implemented (Bledow, Frese, Anderson, Erez, & Farr, 2009; March 1991). Consequently, team innovation is a multistage phenomenon consisting of idea generation and idea implementation, yet innovation moves dynamically and non-linear, not neatly between these stages (Bledow et al., 2009; Cheng & Van de Ven, 1996; West, 2002). Due to the strong element of creative problem solving involved with the innovation process, autonomy, a prerequisite for idea generation, has been a key characteristic of ITs (Zhou, 1998). Moreover, strong reliance on creativity has resulted in a multi-level view of team innovation, attributing the apparent complexity to cross-level differences in creativity requirements and complex interactions among the phenomena operating at a given level of analysis (e.g., Anderson, Potonik, and Zhou, 2014; Mumford and Hunter, 2005). As a result, different levels of antecedents have been proposed at the individual, job, group, and organizational levels of analysis, governed by a wealth of theoretical approaches (e.g., cognitive, motivational, entrepreneurship, leadership, networks, culture, and strategy).

This study defines team innovation as the generation and implementation of novel and useful outcomes (Nijstad & De Dreu, 2002). We acknowledge that team creativity is a core element of team innovation; however, we emphasize generating creative ideas and putting them into action (Hülsheger, Anderson, & Salgado, 2009). Early emphasis is placed on exploration and divergent thinking, whereas in the second stage, the emphasis shifts to exploitation and convergent thinking (Liang, Shu, and Fahr, 2018). We also ground our approach on the assumption that, due to synergies from synthesizing different insights and perspectives, and the mutual stimulation of creative insights, team-based work is fundamental for innovation (van Knippenberg, 2017b; West & Farr, 1990).

Peer pressure and innovative team output

While a certain degree of peer control within a team may stimulate alertness and learning among team members, agile teams tend to have an average or above level of peer pressure. In other words, in agile teams, it is unlikely to observe extreme cases of low peer pressure and the related potential downsides. However, when peer pressure is high, innovative team output can be constrained in several ways. First, pressure to act in a particular way can stifle an individual's intrinsic motivation.

Previous studies compared people with intrinsic motivation with those whose actions tend to be controlled externally. They found that individuals with intrinsic motivation engage more with tasks, show more interest in what they are doing, and are more confident; thus, they perform better and show greater persistence and creativity (e.g., Deci and Ryan, 1991). Such individuals are more likely to take risks and remain focused on tasks for longer, and they also develop ideas or solutions for problems. However, individuals who feel pressured to think and behave in certain ways and whose behavior is monitored closely might have less intrinsic motivation. They may become less focused on team activities (Deci et al., 1989; Deci and Ryan, 1987).

Second, peer pressure implies that team members adhere to collective norms and rules, with violations resulting in various forms of sanctioning by the team. Consequently, for individuals within teams, a sense of introjection arises because they are driven by external regulation (Deci and Ryan, 1985). Under such circumstances, individuals are not operating in response to explicit directives but are instead following the expectations of others. As a result, innovative outcomes will be discouraged, as they often require divergent thinking and behavior and intrinsic or extrinsic stimuli. Thus, we argue that peer pressure within a team will be significantly related to the team's innovative output.

Hypothesis 1*: Team peer pressure will be negatively related to the innovative output of the team.*

Leaders' control and their influence on innovative team output

Peer pressure, in the form of scrutiny from other peer group members, acts as a form of horizontal surveillance; it is different from the vertical control achieved by monitoring the work performance of individuals and teams, enacted through the control systems and behavior of organizational leaders. The controls used by leaders are "formalized procedures and systems that use information to maintain or alter patterns in organizational activities" (Simons, 1987, p. 358). Examples include planning systems, reporting systems, and monitoring procedures that rely on information use. Through reconciling organizational tensions between innovation and efficiency (Henri, 2006), leaders may use control to overcome organizational inertia and bring about both evolutionary and revolutionary changes in the firm (Simons, 1994).

We focus on two distinct types of managerial control. First, one control system, closely related to management-by-exception, is diagnostic control systems (DCS) (Simons, 1991). These systems involve team goals formulated according to a given organizational vision and strategy and related feedback loops. The feedback loops control any deviation from the team's proximal and distal goals, based on the continuous collection of team performance data, and allow different tolerance levels for discrepancies. Second, managers may adopt a more participative approach, such as intervening in daily organizational decisions; this is referred to as interactive control. Managers using this form of control "personally and regularly involve themselves in the decisions of subordinates" (Simons, 1991, p. 49). Interactive control systems are used when team managers and/or external stakeholders regularly stimulate dialogue and interaction with team members; this is done to influence the team members' decisions and the impact of their work and ensure they are focusing on set objectives.

Diagnostic control and innovative team output

By imposing deadlines and providing feedback loops, diagnostic controls can act as "non-synergistic extrinsic motivators" (Amabile, 1993), meaning that they can never be positively associated with intrinsic motivation. Without any diagnosis, team members may lose focus and alignment with organizational goals. However, expert organizations often routinize such controls, and when exercised too frequently or strictly by managers, the controls may prove detrimental to an individual's sense of self-determination. The feeling of being directed by powerful management does not build a sense of competence or a deep engagement with one's work. A work environment that emphasizes extrinsic motivators without supporting intrinsic motivation will, over time, undermine any initial intrinsic motivation (Amabile, 1993). Diagnostic Control Systems are tied to existing lines of authority and responsibility, and they undermine individual commitment to cross-functional processes (Abernethy and Brownell, 1999). To achieve the highest level of creative and productive work, individuals performing complex tasks require a combination of intrinsic motivation and synergistic extrinsic motivation (Amabile, 1993). Diagnostic control can foster single-loop learning, but not the higher-level (double-loop) learning required to encourage innovative behavior (de Haas and Kleingeld, 1999). Also, the use of diagnostic control typically involves limited information flow and structured communication channels, while innovation relies on a free flow of information and open channels of communication (Kohli and Jaworski, 1990). Additionally, Van Den Bosch et al. (1999) suggest that discussion initiated by using diagnostic control will, at best, lead to corrective action. Hence, we hypothesize that:

Hypothesis 2: *Managerial diagnostic control is negatively related to innovative team output.*

Interactive control and innovative team output

According to Simons (1995), interactive control systems are used in contexts with constantly changing information that managers identify strategically important, requiring consistent attention to subordinates and being involved in their decisions. Interactive forms of control mean that data are better interpreted in face-to-face meetings between team members and managers, as this allows continuous debate and formulation of action plans. Interactive control systems are a tight form of control that provides a more open, informal, and subjective exchange of information (Chenhall, 2005). In a context involving rapid, iterative developments, lacking appropriate information can cause difficulties in developing plans for products or services and create issues when making evaluations for changing demands. This suggests that interactive management control systems are needed to facilitate learning and adaptation and make decisions based on adjustable criteria dependent on changing conditions (Chenhall, 2005). Interactive control provides intellectual stimuli, which will be beneficial in generating new knowledge and understanding of relevant cause-and-effect relationships (Henri, 2006). By stimulating dialogue and debate and expediting information exchange, interactive control systems enable knowledge dissemination, communication and distribution of information, and the development of strategic initiatives (e.g., De Haas and Kleingeld, 1999; Simons, 1995). In this way, managers can help teams deal with conflicts arising between innovation and efficiency, hence supporting them to focus on creative activities beyond regular responsibilities (Bass and Avolio, 1994). Thus, we hypothesize that:

Hypothesis 3: *Managerial Interactive control is positively related to innovative team output.*

Cross-level interactions between control mechanisms and innovative team output

Information and feedback from managers make it easier for teams to set targets or goals, allowing them to determine how to make up performance deficits and adjust certain behaviors. When external feedback is received, it may provide a different and unexpected perspective, leading to comparisons between the team's collective perception and a manager's external view (Berg, 1985). When managers behave in ways supportive of a team's goals and actions, they reinforce the team's perceptions of the desired behavior in the organization (Bem, 1973). While diagnostic control may directly damage creative work, we expect it to dampen the negative effect of peer pressure on innovation. In innovative teams, this effect reveals the paradoxical relationship between high autonomy and managerial control. By diverting the focus toward regular activities and efficiency-oriented tasks, diagnostic control itself might break the creative flow of a well-functioning innovation team. However, when peer pressure is high, managerial diagnostics may help a team recognize and resolve some detrimental consequences, such as destructive behavior and sanctioning against creative individuals. Therefore, we argue that while autonomy generally facilitates innovation, it can also bear high peer pressure. At the same time, while it has been shown to stifle innovation, managerial control can equalize cases of high peer pressure, dampening its negative effect.

A manager frequently meeting and speaking with individuals, i.e., a participative approach, may help to create both the intrinsic and extrinsic motivations required for innovative behavior. Managers may provide an outsider view not necessarily aligned with the team's shared norms and values. This may lead to ideas being encouraged or may help resolve tensions and problems standing in the way of innovation, for example, reserving time for individual development and teams accessing required expertise and resources. Thus, we expect both interactive and diagnostic approaches to help mitigate the negative effects of peer pressure on team innovative output. Hence we hypothesize:

Hypothesis 4: *Managerial diagnostic control weakens the negative effect of team peer pressure on innovative team output.*

Hypothesis 5: *Managerial interactive control weakens the negative effect of team peer pressure on innovative team output.*

Methods

Research setting

Agile software development and scrum

Agile software development departs from traditional, plan-based approaches to software engineering (Dybå & Dingsøyr, 2008) to emphasize lean processes and dynamic adaptation rather than detailed front-end plans and heavy documentation (Nerur & Balijepally 2007). It is typically used in settings where it is pivotally important to detect, identify, and respond to emerging user requirements (Beck & Andres, 2005; Schwaber & Beedle, 2002) with minimal formal processes (Cockburn, 2006).

Agile principles, first discussed in the "Agile Manifesto" (Fowler & Highsmith, 2001), aim to create business value by delivering working software to users at regular short intervals. These principles have, in turn, spawned several practices built around two premises: a) self-organizing teams whose members are collocated and work at a sustainable pace, allowing for creativity and productivity; and (b) the active participation of customers (or their surrogates) in the development process, facilitating feedback and reflection to ensure better results (Dingsøyr, Nerur, Balijepally, & Moe, 2012).

"Scrum" is one of the most common agile methods (Dingsøyr et al., 2012). It emerged from the "NPD game," a holistic approach to product development. Self-managing teams implement innovative products in "sprints," i.e., short periods of two to four weeks, each starting with a planning session and ending with a review. Scrum consists of six principles: a) self-managing teams with high autonomy; b) very challenging goals; c) subtle control; d) overlapping development phases; e) multifunctional learning; f) organizational transfer of learning (Takeuchi and Nonaka, 1986). In every team, the product owner (PO), i.e., a functional unit manager, determines the items that need development, which then get listed in the product backlog. The backlog always reflects the current knowledge of necessary tasks (Sutherland & Schwaber, 2007). During each sprint planning phase, team members select the top priority items from the product backlog and include them in the next sprint. Daily meetings coordinate the team's work. On the other hand, the Scrum master, the equivalent of a project manager, is responsible for multiple things, perhaps most importantly, enacting the Scrum values and practices and resolving any issues preventing the team from working effectively.

Participants and procedures

We collected survey data from 97 R&D teams in a telecommunications MNC, including their internal team managers and their higher-level managers in 34 organizational units, located in 11 different countries, including Canada (5), China (16), Croatia (12), Hungry (5), India (2), Ireland (13), Italy (1), Madrid (11), Poland (6), Sweden (25) and the United States (1). Data to develop reliable scales came from 44 exploratory interviews held over three months in the same MNC. To introduce the study and secure the involvement of employees and respective managers, one of the authors contacted the top manager in each of the units involved. The types and sizes of teams and the levels of task complexity were very similar in all the organizational units. Most teams in the study were developing new products to implement new software functionalities. Some of them (9%) were working on software maintenance, undertaking vast activities, including optimization, error correction, deletion of discarded features, and enhancement of existing features. Both types of teams had similar responsibilities and issues concerning innovation and agile initiatives. The average team size was seven members (size ranged from five to nine), and the average agile team had been formed for an approximate average of 1.5 years. Our study defined a team as a group of people who: 1) worked together permanently; 2) reported directly to the same supervisor and group of stakeholders; 3) were coordinated by the same internal team coordinator (Scrum master); 4) recognized themselves as belonging to a team with a unique identifier (i.e., the team's name). Without exception, team members interacted at least once a day during stand-up meetings and/or while completing tasks. Team coordinators were often present to monitor the team's activities at those meetings. To reduce potential common method bias, we gathered data from three different sources. Team members reported on team peer pressure, the team's internal leaders, the team size and age, and their organizational managers reported on diagnostic and interactive controls and innovative team output. All respondents were repeatedly encouraged to participate; we reminded them that a high response rate would increase the reliability of results, which would help their organization. Of the 1,441 questionnaires sent out to team members across 226 teams, we received 726 responses relating to 140 teams (50% response rate). After cleaning the data and assessing inter-rater reliability, retaining only teams where at least two members responded, we obtained a final sample for the analysis made up of 248 team members, 126 teams, and 126 internal team coordinators (Scrum masters). Finally, we conducted a third survey among unit-level team managers one month later; we sent several reminders to these individuals until we received 97 complete responses. We used this time lag to avoid potential issues arising from a concurrent measurement of independent and dependent variables.

Measures

The surveys were in English, the common language used in the company. Some of the items in our survey came from previous research. In some cases, we adapted them slightly to the team context. We used seminal and recent work to develop and validate scales for team-level interactive and diagnostic controls. The surveys were tested in a pilot study on 23 team members and managers across different sites; we asked them to complete the survey and comment on any ambiguity in the questions. We held individual follow-up interviews to collect feedback and suggestions for improving the questionnaire, which we used to revise some items.

Team peer pressure. We used three items from Wright and Barker's (2000) scale to measure peer pressure. This scale represents the first psychological measure used to validate the manifest dynamics of peer pressure, as reported by Barker (1993). The selected items are meant to capture the degree of responsibility, control, or discretion provided by the management system established within a team due to team norms. Specifically, we asked team members to respond to the following items: (a) "My team makes sure that everyone in the team pulls his/her weight," (b) "Within my team, we need the agreement of everyone in the team to decide how to use my working time," and (c) "Within my team, we usually check with other team members before doing something that might affect them."

We assessed team peer pressure and all the team member survey variables on a seven-point Likert scale, ranging from 1 for "strongly disagree" to 7 for "strongly agree."

Interactive and diagnostic controls. We used a systematic approach for scale development, following the steps recommended by seminal references (Hinkin, 1995; Rossiter, 2002). Based on Simons's (1991, 1994) original work and transcripts of interviews with team members and others in the organization, we started by determining a theoretical basis for scale items. We subsequently explored other sources of information, including organizational documentation on the way teams worked, and then created a tentative list of survey items. This resulted in 10 items (5 for each moderator variable). We conducted in-depth interviews with three leaders to check any ambiguity in the item formulation and to suggest improvements to the questions. Of the 10 items, 2 were dropped (1 per variable) due to perceived ambiguity. We conducted an exploratory factor analysis to verify these measures' reliability and internal consistency, and a two-factor structure for the 8 items was confirmed (explaining 78.24% of the variance). The factor loadings ranged from 0.788 to 0.923, which is above the acceptable threshold. Higher-level managers were asked to answer the following four items using a Likert-type scale (from 1 = "strongly disagree" to 7 = "strongly agree"). The items used to measure the interactive control were:

- "I ensure that learning about our products is an important agenda to discuss inside my team or teams"
- "I ensure that product innovation is a regular focus of attention for all the team members within my team(s)"
- "I participate in all the team's ceremonies and events"
- "I continuously challenge and debate team's work progress data or their action plans."

Diagnostic control was measured using the following items:

- "My team is regularly (several times in a month) asked to provide information about our work progress"

- “I regularly see information about the team’s progress in the achievement of their competence goals or learning objectives”
- “Competence goals are regularly (at least twice a year) provided to my team.”

The questions about managerial controls were not inherently positive or negative. Thus, there was no strong reason to believe that managers may try to ascribe unrepresentative behavior to themselves. Nonetheless, to ensure reliability and test the validity of our measurements, we added one question from each leadership control scale to the Scrum masters’ survey. The correlation between the two measures was high ($r=0.64$ for *Diagnostic Control* and $r=0.58$ for *Interactive Control*, $p<0.001$*),* providing additional assurance regarding the credibility of our measurement.

Team innovative output. Higher-level managers assessed the innovative output of their teams using a scale ranging from “very low” (1) to “very high” (7), using items closely related to those used in the company’s internal appraisal system. To ensure the validity and reliability of our measurement, we used several measures before, during, and after our survey. Before launching, to increase the face validity of our survey, we interacted extensively with the company to avoid defensiveness or withdrawal by the respondents (Johnson and Saboe, 2011). We avoided abstract or fully qualitative assessments and rather had managers evaluate innovation performance based on tangible, unbiased, and standardized elements (reflecting internal appraisal systems). The items rated in this way were: patents or the number of ideas generated for new features or new system improvements; new ideas generated for improving the team’s way of working; new ideas generated for minor improvements to existing products; use of new practices, new tools, or ways of working; the implementation of radical/major new product ideas. Ensuring correspondence between our scales and internal measures enabled us to capture variation in performance across the teams without neglecting complex commercial issues, HR problems, technological concerns, or other issues that could influence the teams’ innovation output and are difficult to control due to the company’s confidentiality concerns. During the survey, we interacted with managers through internal communication channels, and we ensured that there was a common understanding of the survey questions. After the survey, to further assess the reliability of our measurement, we secured access to an idea box and checked the correlation between the innovation performance reported by managers and the number of ideas submitted by teams. Not all the teams in our study used an idea box. More importantly, since it was operationalized, it did not cover all instances of innovation. However, there was a strong correlation between two measures ($r=0.61$, $p<0.001$) in the sample that we used (34 teams), providing extra assurance about the credibility of our measurement. As various measures of innovative output have unique aspects, a change in a latent variable may not cause simultaneous variation in all measures (Jarvis, MacKenzie, and Podsakoff, 2003). Hence, different dimensions of innovative output can be considered indices produced by observable variables and are, therefore, formatively measured.

Control variables. Previous research shows that team processes and outcomes can be strongly affected by the group's composition (Williams and O'Reilly, 1998). Group size and team tenure are central among team composition variables and influence group processes and outcomes (e.g., Ancona and Caldwell, 1992; Bantel and Jackson, 1989). We used these variables as control variables in our regression models. The group size was obtained from the internal team managers and evaluated as the number of team members. We assessed team age as the current team's years of experience; this came from the internal team manager's survey.

Aggregation and measurement analysis

The mean inter-rater agreement values for team-level constructs in this article, i.e., peer pressure ($r = 0.78$), exceeded the generally accepted cut-off point of 0.70 for substantial inter-rater agreement (range: 0.67–0.86). To complement these statistics, we also estimated group-size-corrected and intra-class correlation coefficients (ICCs). This procedure yielded acceptable intra-class correlations for the construct (0.72) and significant F-tests ($p < 0.001$), confirming the appropriateness of aggregating individual-level data to the team level. We assessed our multi-item measures' convergent and discriminant validity with confirmatory factor analysis (CFA) on the team-level data. The measurement model included three latent variables constructed by calculating the means for their underlying constructs: peer pressure, diagnostic control, and interactive control. The CFA yielded a non-significant chi-square and a good fit to the data (CFI = 0.93; RMSEA = 0.053). Reliability analyses of our multi-item measures yielded satisfactory Cronbach alpha coefficients ($0.73 \leq \alpha \leq 0.95$). Together, these results support the validity and reliability of our measures.

Results

Table 1 shows means, standard deviations, and bivariate correlations among the key variables of our study across two levels. Table 2 illustrates the results of the multi-level regression model for the outcome variable, i.e., the innovative output of teams. The models indicate a good level of fit and give, more or less, similar results in terms of this study's different focal variables. The team-level construct, i.e., peer pressure, is statistically significant and negative ($\beta = -2.241$), supporting hypothesis 1.

Please insert Table 1 and Table 2 about here

The effects of the two unit-level constructs, i.e., interactive control and diagnostic control, are both significant and in the expected directions in Model 4. The model confirms that interactive control is positively related to innovative output (β= 2.80), and the relationship is statistically significant, supporting hypothesis 3. Diagnostic control is negatively related to the innovative output of the teams (β= −3.08), and the relationship is statistically significant. However, because diagnostic control is not significant in Model 3, this interpretation needs further scrutiny. Because the final model is the strongest in terms of X^2 value and the moderation chart suggests opposing forces that may cancel each other without considering interaction effects, we conclude that hypothesis 2 is supported. The interaction effects of managerial controls and peer pressure are significant: Figures 2 and 3 illustrate these relationships. In interactive control, the figure shows that an increased level of peer pressure negates the control's potential benefits. Conversely, higher levels of diagnostic control seem to be influential when there is greater peer pressure.

Please insert Figures 2 & 3 about here

Discussion

Our study focused on a potential dark side of agile teams and asked how leaders might deal with this. We theorized and found that increased peer pressure to conform is a potential innovation inhibitor. We then identified managerial diagnostic and interactive controls as organizational-level factors that could mitigate or exacerbate this inhibitor. Our results suggest that peer pressure, focused on delivering and meeting deadlines, is linked to lower innovative team output. By illustrating how peer pressure is not beneficial for innovative team output when teams are working on high-intensity R&D activities, this finding contributes to research on normative mechanisms. The study underlines the importance of peer pressure as a motivational state in self-managing teams. We also show that managerial diagnostic and interactive controls moderate the relationship between peer pressure and team innovation. Diagnostic controls positively affect innovative output when peer pressure is high and have a potentially negative effect when peer pressure is low. Interactive controls also demonstrate an overall positive effect, but the effect is strongest when peer pressure is low. Specifically, this work is a first attempt at studying the multi-level performance effects of diagnostic and interactive controls and how they interact with the more commonly studied normative mechanism of peer pressure.

Questions about how various controls can and should be applied have attracted significant scholarly attention. Our study adds to existing research on control dynamics within organizations, for example, between managers and subordinates (e.g., Cardinal et al., 2017; see Long and Sitkin, 2018). Our results suggest that, depending on the level of peer pressure within a team, management control can foster innovative output and is important in the context of self-managing teams. By using interactive control to focus on strategic priorities, such as learning and innovation, managers can help to improve the team's innovative output. These results can be extended to the team level and complement empirical work undertaken by Abernethy and Brownell (1999) and Bisbe and Otley (2004), which indicate the role of control in the context of innovation.

This study also shows that because team members feel constrained by the need to meet deadlines, diagnostic control negatively affects a team's capacity for innovation. This is in line with theoretical arguments supporting the notion that both complementarity and competition exist between diagnostic and interactive controls, giving validity to including both types of control in theoretical and empirical analyses. The results indicate that managerial diagnostic and interactive controls both contribute to a team's innovation capabilities.

Our results also clarify the nature of the relationship between managerial interventions (through diagnostic and interactive control) and the normative mechanism of peer pressure. In innovative team output, diagnostic controls essentially help reduce the negative effects of peer pressure; interactive controls also reduces the negative effects, but to a lesser extent. Thus, consistent with our expectations, the effect of peer pressure on innovative output attenuates as diagnostic control increases. However, the effect is not strong enough that a high level of diagnostic control substitutes entirely for the effect of increased peer pressure.

With these results, we can extend prior research on the determinants of innovation in self-managing teams in several important ways. The study examined how management control systems determine innovative output in the context of self-managing teams. Overall, the findings indicate that with lower peer pressure, interactive managerial control makes a positive contribution to the innovative output of a team; however, diagnostic control does the opposite. When peer pressure is high, both control approaches seem to be useful in helping teams to overcome innovation challenges. This study adds to current research on managerial controls by proposing a theoretical framework that offers insights into the role of controls in implementing organizational strategies at the team level. The study helps better understand the complexity of multiple controls characterizing workers who support firms in achieving their organizational goals in the post-bureaucratic era. It also empirically tests the model proposed by Simons (1995), confirming that control systems are tools used in implementing strategies, giving rise to the emergence of new strategies. However, the study extends the Simons model by introducing a new unit of analysis: managerial control in teams. In contrast to that model, where it was unclear how leaders' control could be combined with autonomous, social mechanisms, this study shows how leaders may use control to secure and extend the positive effects of self-managing teams, helping them become or remain more innovative.

Past research has recognized that multiple controls may be used concurrently in teams, but the effect on team performance has not been considered (Barker, 1993). Previous studies investigated the nature of impact without considering different controls' interdependent or joint effects (Henderson and Lee, 1992). Our study demonstrates that controls can complement each other or interact so that when used in combination, the impact on a team's innovative capabilities is stronger than when any form is used alone. We do not suggest, as traditional control theory would indicate, that controls can only be used as replacements for one another (Choudhury and Sabherwal, 2003). Complementarity and interactions between different controls depend on each control's specific nature and how they influence a predetermined outcome, both independently and jointly. Our findings on the relationship between managerial controls, both diagnostic and interactive, and peer pressure offer scope to extend the theory on organizational control. We provide a more comprehensive theoretical understanding of how different controls, formal and informal, combine and interact to influence team capabilities. Even though earlier current control theory provided insights into the different types of control mechanisms used by organizations, there is still no clear understanding of the specific working processes (Loughry and Tosi, 2008; Stewart et al., 2012), interrelationships between the controls, and their impacts on teams. Because it elicits the conditions needed for control mechanisms to interact with each other, theorizing about control interactions offers a holistic understanding of the phenomenon (Bendersky, 2003; Chadwick, 2010).

Our research draws on organizational control theory (Cardinal, 2001; Long et al., 2011; Sitkin et al., 2010) to explain team-level dynamics and outcomes. Cardinal and Kreutzer (2013) argue that most work on organizational control focuses on formal control. Research on informal control, such as peer pressure, pays no attention to specific controls that managers and team members can use to mitigate its effects. Understanding how organizations handle both formal and informal control systems requires a deep understanding of the mechanisms available to managers and what implications their use might have for team capabilities. Our work explores these issues in some depth by looking at the effects of using diagnostic and interactive controls both separately and in combination. Several scholars claim that formal controls are becoming less important due to the increasing team-based and knowledge-based work (Hagel et al., 2010; Kirsch et al., 2010; Kreutzer et al., 2014) that this creates a need to understand better how informal controls work. Our theorizing on the complementary use of controls reveals a set of criteria that managers could potentially use to reduce the negative effects of peer pressure.

Our findings support the notion that team peer pressure is a motivational state that can undermine the team's innovative output. It confirms the hypothesis put forward by Barker and Tompkins (1994) that as peer pressure (which Barker referred to as concertive control) becomes stronger, a team can reach the point of diminishing returns. When there is a high level of peer pressure, team members have to surrender too much of their identity for the team's sake, which has a detrimental effect on motivation. Our focus on informal team-related factors, such as peer pressure, provides a more finely-grained understanding of how peer pressure affects a team's innovative abilities. This confirms the usefulness of Wright and Barker's (2000) scale in a different setting than Hilgermann (1998), who applied the construct both in a service organization and with manufacturing workers. Hilgermann found a positive relationship between the extent of peer pressure in the team environment and team outcomes, such as job satisfaction and effectiveness. This is in line with Henderson and Lee's (1992) results, which, although exploratory, show that, in the context of design teams, team members' control positively affects team performance. The contrast with our observations underlines the need to explore peer pressure mechanisms further to reconcile these different results. In addition, to increase the generalizability of these findings, the effect that tasks have on teams' control behavior should be investigated. For example, our case included teams employed in highly complex R&D activities requiring a specific level of learning. Previous studies investigated how other forces exerted by peers affect team performance (Stewart et al., 2012). However, despite its increasing importance in modern organizations, few studies have explored the influence of peer pressure. More research is needed to fully understand the joint influence of peer pressure and other peer forces–particularly investigating the combined effect of peer-based normative mechanisms and rational control mechanisms in the context of self-managing teams.

Limitations and future research

While the methodology employed had several strengths, such as its use of multi-level data and multiple sources, it could be improved by using longitudinal data, which could more clearly determine the direction of causality. Nevertheless, since our hypotheses were driven by theory and the team members were assigned to their team from the organization, we can argue that these issues do not significantly impact the interpretation of the results. However, future research should use a longitudinal study or experimental design to establish the direction of causality. Findings from longitudinal datasets could improve the internal validity of our results by providing time-lagged data. Moreover, assuring that cross-level direct parameters represent the theoretical cross-level effects, a high degree of within-group agreement is essential (LoPilato & Vandenberg, 2015). While our analysis presents a satisfactory level of within-group agreement, future studies may consider settings that incorporate input from all team members, hence providing an even higher level of confidence in interpreting cross-level direct effects. Finally, our data were gathered in a single organizational context, the selected MNC. The study should be replicated using samples from different organizations to check whether the findings are generalizable to other settings.

Practical implications

Managers and team leaders attempting to introduce a flatter, more decentralized structure involving self-managing teams must encourage their teams and the entire organization to achieve higher performance and continue working toward the strategic goals set by the organization (Alexiou, Khanagha, Schippers, 2017). In our previous research regarding self-managing teams in complex R&D environments, and throughout the present study, we frequently observed inefficiencies, poorly coordinated efforts, and frustration from stakeholders. Innovation management literature pays little attention to issues, such as how managers should intervene and steer their teams toward higher levels of innovation. The results of this study suggest that when there is no peer pressure within a team, the dynamic tension generated from using both diagnostic and interactive controls can positively affect team innovation. This study provides a better understanding of how people working in self-managing teams, despite being empowered by autonomy, can often be constrained by accumulated peer pressure, leading to reducing the team's innovative output. For team managers, this study suggests various interventions to help improve overall team performance when team members are subject to peer pressure. In particular, our findings indicate that in teams with a high level of peer pressure, managers should ensure that team members keep a healthy focus on innovation and avoid excessive focus on routine, short-term-oriented tasks.

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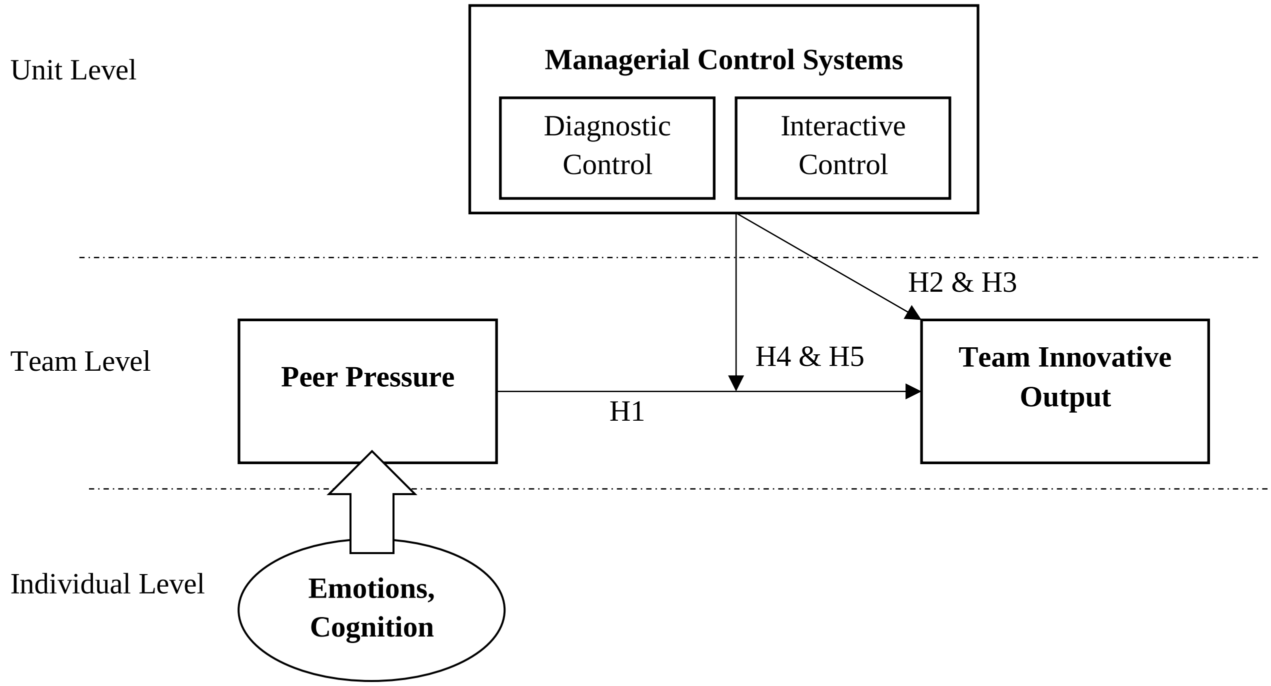

Figure 1: Research Model and Hypotheses

TABLE 1. MEANS, STANDARD DEVIATIONS AND CORRELATIONS

	n	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)
(1) Team Age (years)	97	1.5	0.450						
(2) Team Size (fte)	97	6.932	1.754	0.037					
(3) Team Structure	97	5.480	0.932	0.083	-0.104				
(4) Peer Pressure	97	5.016	0.973	0.150	-0.089	0.623*			
(5) Team Innovative output	97	4.343	1.363	0.147	0.103	0.032	-0.018		
(6) Diagnostic Control	34	5.780	1.029	-0.207	0.143	0.161	0.064	-0.008	
(7) Interactive Control	34	5.710	0.879	0.002	-0.005	0.278	0.163	0.285	0.369*

Correlations above |0.22| are significant at $p < 0.01$

TABLE 2: RESULTS OF HLM ANALYSIS OF TEAM INNOVATIVE OUTCOME

	Model 1			Model 2			Model 3			Model 4		
Variable	B (s.e.)	t	p	B (s.e.)	t	p	B (s.e.)	t	p	B (s.e.)	t	p
Intercept	4.41 (0.13)	32.97	0.00	4.06 (0.98)	4.16	0.00	1.64 (1.31)	1.25	0.21	10.31 (4.32)	2.39	0.02
Team-level (Level 1)												
Team Age				0.24 (0.09)	2.70	0.01	0.23 (0.08)	2.81	0.00	0.32 (0.77)	4.12	0.00
Team Size				0.17 (0.17)	1.02	0.31	0.10 (0.17)	0.63	0.52	0.20 (0.15)	0.13	0.90
Team Structure				0.12 (0.14)	0.83	0.41	0.10 (0.13)	0.70	0.49	0.20 (0.13)	1.53	0.13
Peer Pressure (PP)				**-0.28 (0.15)**	**-1.84**	**0.06**	**-0.31(0.15)**	**-2.11**	**0.03**	**-2.24 (0.85)**	**-2.63**	**0.01**
Unit-level (Level 2)												
Interactive Control (IC)							**0.42 (0.17)**	**2.50**	**0.01**	**1.77 (0.63)**	**2.80**	**0.00**
Diagnostic Control (DC)							0.09 (0.15)	0.58	0.57	**-2.67 (0.87)**	**-3.08**	**0.00**
Cross-level interaction effects										**-0.27 (0.12)**	**-2.20**	**0.03**
PP × IC										**0.56 (0.17)**	**3.26**	**0.00**
PP × DC												
X^2	.		.	9.74		0.04	17.58		0.01	32.28	0.00	
Log likelihood	-216.28			-158.22			-150.30			-146.43		

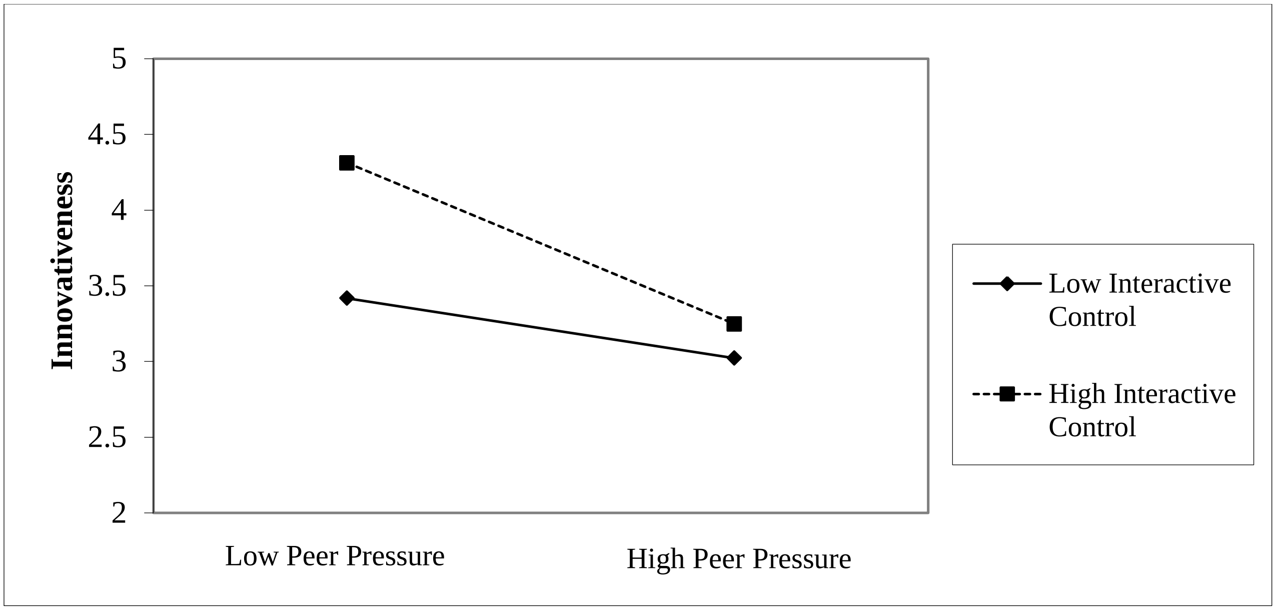

Figure 2: Peer pressure by Interactive control on Innovative output

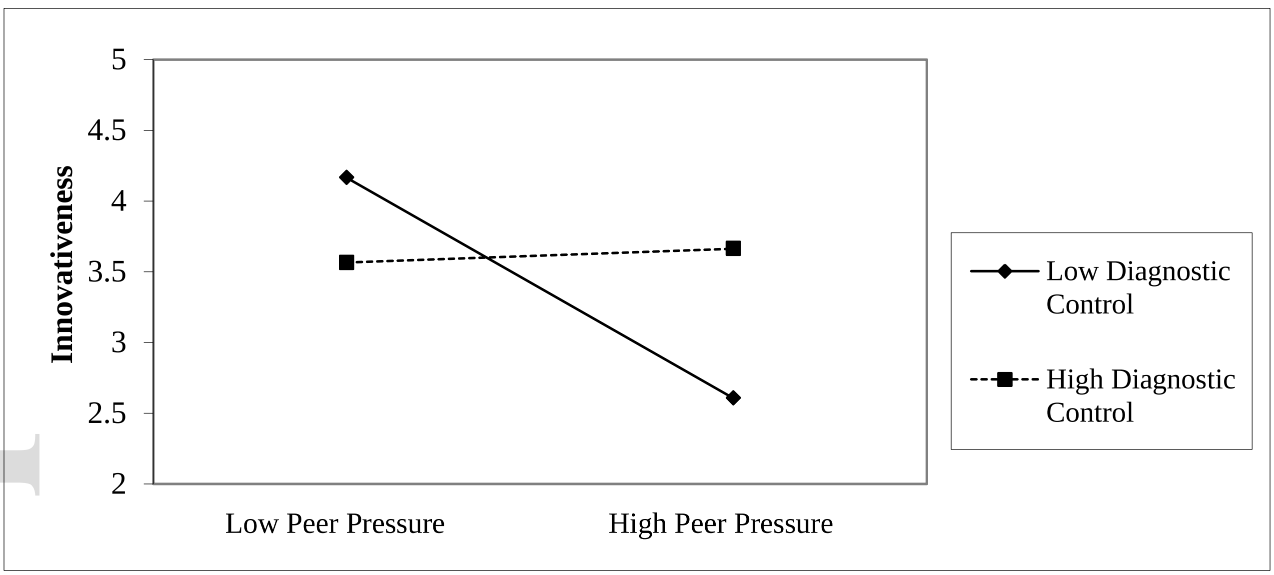

Figure 3: Peer pressure by Diagnostic Control on Innovative output